UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/520,677	03/07/2000	Garry Z. Gu	56115534-120430	9129

			EXAMINER
26291	7590	11/29/2004	VOLPER, THOMAS E

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ART UNIT	PAPER NUMBER
2665	

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No.	Applicant(s)	
Office Action Summary		09/520,677	GU, GARRY Z.	
		Examiner	Art Unit	
		Thomas Volper	2665	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 10-13, 15-27 and 31-36* is/are rejected.

7)☒ Claim(s) *7-9, 14 and 28-30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant appears to argue that the Examiner's description of "reading the degree of fullness of the output buffers" in Larsson does not actually occur in the present invention, thus the conclusion that Larsson discloses the claimed feature of an integrator block for receiving a token bit and updating a grant credit in response thereto is incorrect. The Examiner disagrees with this statement. Larsson discloses input buffers, which meet the limitation of first stage port processors, that take into account the fullness of output buffers in determining how many credits each input port may be given. This does occur in the present invention since the token bit being used to update grant credits at a particular first port processor is based on receiving a packet at a second stage port processor. The token bit is based on a fullness of a particular second stage port processor, at least as far as claims 1 and 10 are concerned. In fact, the Specification of the present invention states with respect to the statistics block of a second stage port processor, "each statistics block 208 of Stage-2 accumulates the number of arrivals and departures by incrementing the statistics counter 214 by 1 for each arrival and by decrementing the statistics counter by 1 for each departure. A statistics block may include a simple up/down counter 214 for incrementing a count when a packet arrives, and decrementing a count when the packet departs" (page 8, lines 28-35). This counter, which provides a measure of fullness in the statistics block, is what triggers a token bit to be sent to a first stage port processor. Larsson states that the number of credits to be granted during a next time interval may be based on how many cells have been granted transmission permission during the current time interval (col. 5, lines 41-44). This

shows a relationship between data cells received in the output buffers and how many credits may

be granted at the input buffers, as in the present invention. Larsson does not disclose that the

credits are granted via a token bit, however, the Examiner relies on Caldara for providing the

feature of a token bit.

2.   Applicant argues that the Examiner refused to accept Applicant's prior argument that

Caldara teaches a two-step process sending a request and then sending actual data, contrary to

the present invention. Applicant also argues that Larsson also provides a similar two-step

process. Upon further inspection, it appears that Larsson also does not provide the one-step

process of granting credit without any request, as previously claimed by the Examiner. Thus, a

new ground of rejection is made in view of Hunt et al. (US 6,249,819). However, Larsson and

Caldara, are still useful for teaching the other features of the present invention for which they

have previously been relied upon.

3.   Applicant acknowledges the previous indication of allowable subject matter in claims 6

and 13, and has presented similar limitations in the newly added independent claims 19 and 31.

However, upon further inspection of Larsson the Examiner believes the reference meets the

limitations of these claims and has included them in the following 35 U.S.C. 103(a) rejection.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

5.   Claims 1-6, 10-13, 15-27, and 31-36 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Larsson et al. (US 6,172,963) in view of Caldara et al. (US 5,978,359) and

Hunt et al. (US 6,249,819).

        Regarding claim 1, 6, 10, 11, 13, 15, 18-21, 31, 32, and 34-36, Larsson discloses a credit-

based flow control system for a switching network with input and output buffers. The input and

output buffers meet the limitation of first and second stage port processors as in the present

invention. The system takes into account the degree of fullness of the output buffers when

determining how many cells (credits) can be sent from each input port. This process is called

"giving credit" (col. 3, lines 21-30). With intelligence in the switch, it can be determined which

output ports are able to receive cells (col. 4, lines 45-55). In the preferred embodiment, Larsson

discloses a control unit (20) located in the switch core (8) for performing the intelligence.

However, the intelligence may also be located outside the switch core and incorporated into the

input buffers. In this case, the input ports would read the degree of fullness of the output buffers

and calculate how many cells can be sent (col. 5, lines 12-23). This description meets the

limitation of an integrator block in a first stage port processor, as in the present application. The

limitation of neighboring integrator blocks is met by Larsson in that calculating the number of

cells to be sent to a particular output buffer includes determining which input ports should be

allowed to send cells if several input ports are competing for the output buffer (col. 5, lines 31-

36). Larsson also discloses determining which input ports are allowed to send cells based on

priority classification (col. 5, lines 31-40). Thus, a higher priority input will be granted a greater

number of credits, and some input must have the highest number of credits during each interval.

It is obvious to send a cell through the input port with the highest number of grant credits if it is

associated with a high priority connection. Larsson shows input ports (2-4) and output ports (5-7) in equal numbers, thus meeting the limitation of corresponding integrator blocks (Figure 3). Larsson fails to expressly disclose sending a token bit from a second stage port processor to the neighboring first stage port processors in response to receiving a data packet at the second stage port processor.

Caldara discloses a switching architecture that includes a first set of port processors, called To Switch Port Processors (TSPP) (14) and a second set of port processors, called From Switch Port Processors (FSPP) (16). These sets of TSPP's and FSPP's can be construed as first and second stages in the switch, respectively. Caldara also discloses a feedback message (30) that provides an indication of buffer status at the output port. To provide efficient flow control, the feedback message from the output port to the input port includes several sub-type messages, including an ACCEPT/ REJECT bit (col. 5, line 64 – col. 6, line 14). This bit is considered to provide the function of the token bit of the applicant's invention. Caldara discloses it is determined if the output buffers become filled to a threshold level when sending the feedback message in order to prevent cell loss (col. 4, lines 37-53). It is obvious that some component must be present to count the number of cells in the output buffers and compare them to a threshold level in order to provide the functionality disclosed in the cited passage. This functionality in Caldara meets the limitation of a statistic block as described in the present application.

Hunt discloses a Quantum Flow Control method wherein a downstream element may grant a certain number of credits to an upstream element, thus granting that upstream element

permission to transmit to the downstream element, without any request from the upstream element (col. 3, lines 36-62).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the feedback message of Caldara in combination with the credit based flow control system of Larsson to provide a switch that selectively sends data from a first stage to a second stage in accordance with the fullness or availability of each output buffer in the second stage. The feedback message of Caldara would notify the intelligent input ports in the first stage of Larsson as to the availability of the output buffers in order to calculate the credit given to each input port. It also would have been obvious to provide the feedback message of Caldara without receiving a request from a first stage, as in Hunt.

One of ordinary skill in the art would have been motivated to send a message like the ACCEPT/REJECT bit of Caldara in the invention of Larsson in order to provide the input ports with the flow control information necessary to calculate the number of credits. One of ordinary skill in the art would have been motivated to do this without receiving a request from the input ports of Larsson in order to create a more efficient switching network.

Regarding claims 2, 3, 22, and 23 Larsson discloses multiple input ports. The teaching above provides a description for the incorporation of intelligence into the input port. This description provides for an equivalent to neighboring integrator blocks.

Regarding claims 4, 5, 12, 16, 17, 24-27, and 33 Larsson discloses that the number of cells (credits) that can be sent are calculated for a time interval and depend on the number of cells already in the output buffers (col. 3, lines 45-58). Depending on the fullness of the output

buffers from interval to interval, that the number of credits will change. This effectively

achieves the process of incrementing and decrementing credits between time intervals.

Allowable Subject Matter

6.   Claims 7-9, 14, and 28-30 objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the base

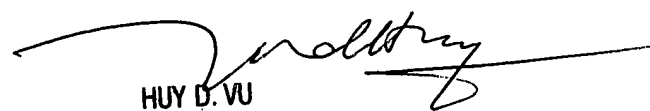claim and any intervening claims.

Conclusion

7.   Any inquiry concerning this communication, or earlier communications from the

examiner should be directed to Thomas Volper whose telephone number is (571) 272-3151. The

examiner can normally be reached between 8:30am and 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Huy Vu, can be reached at (571) 272-3155. Any inquiry of a general nature or

relating to the status of this application or proceeding should be directed to the receptionist

whose telephone number is (571) 272-2600.

Thomas E. Volper

November 22, 2004

HUY D. VU
SUPERVISORY PATENT EXAMINER
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